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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,267	09/13/2005	Volker Rasche	PHNL030288US	1659
38107 7590 01/25/2008 PHILIPS INTELLECTUAL PROPERTY & STANDARDS 595 MINER ROAD CLEVELAND, OH 44143			EXAMINER CORBETT, JOHN M	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary

Application No. 10/549,267	Applicant(s) RASCHE ET AL.	
Examiner John M. Corbett	Art Unit 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-6 and 8-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-6 and 8-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 1 August 2007.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 3-4, 9, 14 and 18 are objected to because of the following informalities, which appear to be minor draft errors including grammatical and/or lack of antecedent basis problems.

In the following format (location of objection; suggestion for correction), the following correction(s) may obviate the objection(s):

Claim 3, line 1, "The method as claimed in claim 2" was claimed; perhaps --The method as claimed in claim 1-- was meant.

Claim 9, line 1, "The method as claimed in claim 2" was claimed; perhaps --The method as claimed in claim 1-- was meant.

Claim 14, line 4, "by overlaying making" is grammatically incorrect.

Claim 18, line 3, "viz a viz" is awkward and narrative.

Appropriate correction is required.

Claim 4 is objected to by virtue of its dependency.

Note: For examination purposes, claims 3 and 9 are taken to be dependent upon claim 1.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 14 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the

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specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

With respect to claim 14, the specification fails to define what constitutes a "run" and what is being "overlaid" from these "runs". Consequently, the specification as originally filed fails to enable one of ordinary skill in the art to make and/or use the invention of these claims.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the various corrected two-dimensional images" in lines 13-14. There is insufficient antecedent basis for this limitation in the claim. Claims 2-17 are rejected by virtue of their dependency.

Claim 18 recites the limitation "the various corrected two-dimensional images" in lines 11-12. There is insufficient antecedent basis for this limitation in the claim.

4. Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP

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§ 2172.01. The omitted step is motion correcting through two-dimensional image-warping through a vector field such that identified marker/features are moved to their two-dimensional reference position, while using interpolation to correct the rest of the image.

These claims include the steps of deriving motion correction and then reconstructing. Nowhere is there a step for generating corrected two-dimensional images. Such a step is critical and essential as seen on page 3, lines 30-32 of the Applicant's specification. Therefore, the claims are rejected for missing an essential step. Claims 2-17 are rejected by virtue of their dependency.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 3-6, 8-9, 11-13, 15 and 17-18 rejected under 35 U.S.C. 102(e) as being anticipated by Edic et al. (20040136490).

With respect to claim 1, Edic et al. teaches an X-ray (12) imaging (64) method comprising the following steps:

forming a set of a plurality of two-dimensional X-Ray projection images (82) of a medical object (18) to be examined through a scanning rotation (52) by an X-Ray source (12), which X-Ray images are acquired at respective predetermined time instants (96) with respect to a functionality process (Paragraph 43) produced by said object;

separating an estimated motion of parts of said object into a non-linear temporal component caused by overall contraction within said object, and a linear temporal component caused by an overall rotation within said object (Paragraphs 64 and 69-70),

reconstructing by back-projection a three-dimensional volume image of said object from the set of two-dimensional X-Ray projection images (Paragraph 63),

deriving an appropriate motion correction for the respective two-dimensional images as based on a motion vector field (Paragraphs 41-45 and 64), and subsequently from the various two-dimensional images reconstructing the intended three-dimensional volume (Paragraphs 33 and 43-45)

wherein said motion correction is derived from reference images that are acquired in corresponding instants of the movement of the object in question that is substantially periodic (Paragraph 43), and which reference images have substantially differing projection orientations (Figure 3).

With respect to claim 18, Edic et al. teaches an X-Ray apparatus (Figures 1-2) comprising an X-Ray facility (50) for forming a set of a plurality of two-dimensional X-Ray projection images (82) of an object (18) to be examined through a scanning rotation (52) by an

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X-Ray source (12), which X-Ray images are acquired at respective predetermined time instants (96) with respect to a functionality process (Paragraph 43) produced by said object;

data processing means (36 and 40) fed by said X-Ray facility for reconstructing by back-projection (Paragraph 10) a three-dimensional volume image (Paragraph 33) of said object from the set of X-Ray projection images, and

correcting means (36 and 40) interacting with said data processing means for by deriving an appropriate motion correction for the respective two-dimensional images as based on a motion vector field (Paragraphs 41-45 and 64), and for subsequently feeding the various two-dimensional images to said data processing means for reconstructing the intended three-dimensional volume (Paragraphs 33 and 43-45 and Figures 1-2).

With respect to claim 3, Edic et al. further teaches wherein said corresponding instants refer to corresponding phases of a cardiac movement (Paragraph 43).

With respect to claim 4, Edic et al. further teaches wherein said movement is derived from following one or more feature points of the object (Paragraph 37).

With respect to claim 5, Edic et al. necessarily teaches based on feature extraction for deriving said motion vector field (Paragraph 64 and 69-70).

With respect to claim 6, Edic et al further teaches wherein two-dimensional projections are corrected towards a calculated shape by the functionality process of said object (Paragraphs 41, 43-45, 64, 66-67 and 69-70).

With respect to claim 8, Edic et al. further teaches applied to coronary arteries (Paragraph 37).

With respect to claim 9, Edic et al. further teaches wherein said projection orientations differ by an angle in a range between substantially 45 degrees and 90 degrees (Paragraph 40).

With respect to claim 11, Edic et al. necessarily teaches deriving said motion correction from physical elements present in the object (Paragraph 64 and 69-70).

With respect to claim 12, Edic et al. necessarily teaches including in said correction an overall translation pertaining to said object (Paragraphs 41, 43-45, 64, 66-67 and 69-70).

With respect to claim 13, Edic et al. further teaches deriving an amount of movement correction through an ECG analysis (Paragraphs 41 and 48).

With respect to claim 15, Edic et al. further teaches generating a four-dimensional data set (Paragraph 45).

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With respect to claim 17, Edic et al. further teaches forward projecting the volume data into the successively acquired projections with different projection geometry (Paragraph 64).

6. Claim 18 is rejected under 35 U.S.C. 102(b) as being anticipated by Rodet et al. (US 20020131650 A1).

With respect to claim 18, Rodet et al. teaches an X-Ray apparatus (Figure 1) comprising an X-Ray facility for forming a set of a plurality of two-dimensional X-Ray projection images of an object to be examined through a scanning rotation by an X-Ray source, which X-Ray images are acquired at respective predetermined time instants with respect to a functionality process produced by said object (Paragraphs 15 and 17 and Figure 1);

necessarily a data processing means fed by said X-Ray facility for reconstructing by back-projection a three-dimensional volume image of said object from the set of X-Ray projection images (Paragraphs 4, 15, 24, Step P4 of Figure 3 and Figure 9), and

necessarily a correcting means interacting with said data processing means for by deriving an appropriate motion correction for the respective two-dimensional images as based on a motion vector field, and for subsequently feeding the various two-dimensional images to said data processing means for reconstructing the intended three-dimensional volume (Paragraphs 33-34 and Figures 3 and 9).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 10, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edic et al. as applied to claim 1 above, and further in view of Chen et al. (7,113,623).

With respect to claim 10, Edic et al. discloses the method as recited above. Edic et al. fails to teach explicitly teach a coronary artery with a stent in place and an artery wall section of said artery being under investigation.

Chen et al. teaches a coronary artery with a stent in place and an artery wall section of said artery being under investigation (Col. 1, line 61-66).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Edic et al. to include the stent of Chen et al., since a person would have been motivated to make such a modification to improve patient outcomes and enhance patient safety by providing patient specific images during the catheter-based interventions (Col. 1, lines 61-66 and Col. 3, lines 47-52) as taught by Chen et al.

With respect to claim 14, Edic et al. discloses the method as recited above. Edic et al. further teaches using built-in (36) cardiac motion compensation for three-dimensional cardiac

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ROI reconstruction. Edic et al. fails to teach generating and overlaying multiple runs of a cardiac region whilst maintaining one or more markers at the same position, and by overlaying making the multiple cardiac ROI reconstructions.

Chen et al. teaches generating and overlaying multiple runs of a cardiac region whilst maintaining one or more markers at the same position, and by overlaying making the multiple cardiac ROI reconstructions (Abstract and Col. 20, lines 38-54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Edic et al. to include the overlaying of Chen et al., since a person would have been motivated to make such a modification to improve patient outcomes and enhance patient safety by providing patient specific 4-D images during the placement of stents with percutaneous catheter-based interventions (Col. 1, lines 61-66 and Col. 3, lines 47-52) as taught by Chen et al.

With respect to claim 16, Edic et al. discloses the method as recited above. Edic et al. further teaches determining a temporal gating as being based on a feature point location (Paragraph 41). Edic et al. fails to teach a three-dimensional resolving.

Chen et al. teaches a three-dimensional resolving (Figures 3-5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Edic et al. to include the three-dimensional resolving of Chen et al., since a person would have been motivated to make such a modification to obtain more information by analysis feature specific motion of an object with a complex motion process

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(Abstract, Col. 2, lines 50-54, Col. 3, lines 35-38, and Col. 3, line 56 – Col. 4, line 2) as implied by Chen et al.

Response to Arguments

8. Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection.

9. Applicant's other arguments filed 26 September 2007 have been fully considered but they are not persuasive.

With respect to claim 18, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., separating an estimated motion of parts of said object into a non-linear temporal component caused by overall contraction within said object, and a linear temporal component caused by an overall rotation within said object, wherein said motion correction is derived from reference images that are acquired in corresponding instants of the movement of the object in question that is substantially periodic, and which reference images have substantially differing projection orientations) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. In addition, although the Applicant notes on page 8, line 19, of Applicant's Remarks that claim 18 was amended, no such amendment was in fact made. Therefore, the Applicant's argument is not persuasive, and the claim remains rejected.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John M. Corbett whose telephone number is (571) 272-8284.


The examiner can normally be reached on M-F 8 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

22 January 2007

JMC



EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER